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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/866,399	05/25/2001	Yunnan Wu	MH-5072	4996

7590 09/23/2005

Patent Department
Mitsubishi Electric Research Laboratories, Inc.
201 Broadway
Cambridge, MA 02139

EXAMINER	
GREY, CHRISTOPHER P	

ART UNIT	PAPER NUMBER
2667	

DATE MAILED: 09/23/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/866,399	WU ET AL.	
	Examiner	Art Unit	
	Christopher P Grey	2667	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *25 May 2001*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-16* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☐ Claim(s) *1-16* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. Responsive to the amendment filed on May 17, 2005, the abstract has been entered as requested.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claim 1, 4, 8, 9, 12, 13, 14, 15 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Waclawsky et al. (US 5226041) in view of Lauer (US 5528591)

Claim 1 and 16 Waclawsky et al. ('Waclawsky' hereinafter) discloses a method/system within a data communications network that sends a plurality of data packets from a sending node (sender end system) to a destination node (receiver end system). Before the packets reach the destination node, they experience an intermediate node (see Figs 1 A-M) having a queue. The queue outputs the data packets and queue size information (queue occupancy). The destination node sends a marker (feedback) to the sending node to indicate the receipt of the data packets. The method also discloses the computation of the time duration to transmit the data packets from the sending node to the destination node, and also the transit time for sending the marker from the destination node to the sending node. These transit times are recorded

in a data processor and updated for each cycle. Waclawsky discloses sending a second window's worth of data packets with a size dependant on queue size information (predicted queue occupancy) (disclosed in Col 1 line 60- Col 2 line 33).

Waclawsky does not specifically disclose modeling the channel as a queue.

Lauer discloses providing flow control on a connection from a source to a destination. Similar to the operation of a queue, Lauer discloses sending feedback from the destination node in order to control the rate that a source end system is transmitting packets (Col 3 lines 35-Col 4 lines 26).

It would have been obvious to one of the ordinary skill in the art at the time of the invention to modify the destination as disclosed by Waclawsky, to perform the operation of adjusting the rate depending on the destinations ability to receive data. Furthermore, it would have been obvious to one of the ordinary skill in the art at the time of the invention that a queue performs many functions, and in order to model a channel as a queue, merely adjusting the rate on the channel will justify this as taken in its broadest term . The motivation for these modifications is to employ end-to-end flow control.

Claim 4 Waclawsky discloses a cycle time duration that is equal to the time of receipt of a second marker (feedback) – time of receipt of a first marker (Col 4 lines 40-44). Waclawsky also discloses capturing a time duration of a first and second cycle, necessary to transmit a packet from the sender node to the receiver node (Col 2 lines14-52). These cycle duration times are stored in a data processor.

Claim 8 Waclawsky discloses an origin node connected to a destination node via an intermediate node (relay), with a link (element 32) from the origin to the intermediate and a link (element 36) from the intermediate to the destination (See figs 1 A-M).

Claim 9 After the first cycle the origin node (sender) determines the size of the queue (queue occupancy) as denoted by Q1 in Figs 1 A-M. The intermediate node determines a threshold V2, where V2=1 represents exceeding the threshold (fullness) of the intermediate node. Q2 within the intermediate node depicts a second queue size (queue occupancy) that is related to a second link (element 36) (disclosed in Col 5 line52- Col 6 line25).

Claim 12 Waclawsky discloses within the intermediate node (relay), denoting the size of a second queue (queue occupancy) and a threshold value (traffic management). Waclawsky also discloses when a threshold value has been exceeded, decrementing (content adaptation) the current window size (disclosed in Col 6 lines 8-25).

Claim 13 Waclawsky discloses in Figs 1 A-M a loop existing from the origin to the intermediate node via element 32 and from the intermediate node back to the origin via element 40. This loop is dependant/controlled by a threshold value. Waclawsky also discloses a control loop from the intermediate node to the destination node via element 36, and from the destination node to the intermediate node via element 38 and the origin node, where once again threshold is used as a control.

Waclawsky does not specifically disclose the relay and the receiver forming a second loop.

Lauer discloses the destination node sending an update message back to the source node through an intermediate system, where the intermediate system adds additional update information to the message (Col 4 lines 1-26).

It would have been obvious to one of the ordinary skill in the art at the time of the invention to modify the invention Waclawsky to send the response through the intermediate node as disclosed by Lauer. The motivation for this modification is to update the congestion status of the path (Col 4 lines 1-25).

Claim 14 Waclawsky discloses decrementing (content adaptation/withdrawal) the current size of the window when a threshold value is exceeded (Col 6 lines 8-25).

Claim 15 Waclawsky discloses decrementing (withdrawal/update) the current size of the current window (number of bits). This takes place in the window generator, which is contained within the origin (Col 6 lines 8-25).

3. Claims 2, 6, 7, 10, 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Waclawsky et al. (US 5226041) in view of Lauer (US 5528591) in further view of Li et al. (US 6741555)

Claim 2 Waclawsky discloses incrementing the window size (sending the next packet) by one packet when the maximum queue size is equal to 0 (disclosed in Col 5 lines 15-34). Waclawsky also discloses a second window's worth of data packets being sent in response to a marker (feedback) being received by the sender. Waclawsky does not disclose delaying the sending of the next packet until the queue occupancy is one.

Li et al. ('Li' hereinafter) discloses a method aimed at congestion control where when a designated threshold of the average queue size (queue occupancy) is exceeded (queue occupancy is greater than 1) there is a reduction in the transmission rate/speed (delay) and congestion window (disclosed in Col 4 line 51- Col 5 line25).

Therefore it would have been obvious to one of the ordinary skill in the art at the time if the invention to enhance the efficient method of sending data packets from end to end using queuing and time samples as disclosed by Waclawsky, with the congestion control method disclosed by Li, in order to achieve a more efficient means of controlling the congestion (Li Col 1 lines 7-11).

Claim 6 Waclawsky fails to discloses counting lost packets, inferring and updating the available queue occupancy, considering the lost packets when predicting the queue occupancy and using the available queue occupancy to determine a speed of congestion control.

Li et al. Discloses within a TCP, acknowledging that a data packet is lost (counting individually) by resetting its current window (updating queue occupancy) and threshold, and reducing the sending speed of packets (Col 9 lines 60- Col 10 line15). The motivation is the same as that for claim 2.

Claim 7 Waclawsky discloses computing a next window's worth of data packets (predicting queue occupancy), but does not disclose predicting packet loss and informing an encoder.

Li discloses informing a source node (encoder) of congestion and packet loss through an acknowledgment packet. Li discloses retransmitting a packet lost via the source node (disclosed in Col 4 line 51- Col 5 line 13).

The motivation is the same as that for claim 2. Another motivation for enhancing Waclawsky's invention with Li's is to better deal with packet loss.

Claim 10 Waclawsky discloses sending a marker (transport data) from the destination node to the sender node to indicate that a packet has been received (Col 1 line 60- Col 2 line12). Waclawsky does not disclose sending application feedback.

Li discloses informing a source node (feedback) of congestion and packet loss through an acknowledgment packet (application feedback) (disclosed in Col 4 line 51- Col 5 line 13). The motivation is the same as that for claim 2.

Claim 11 Waclawsky discloses sending a marker (transport data) from the destination node to the sender node to indicate that a packet has been received (Col 1 line 60- Col 2 line12). Waclawsky does not disclose reducing the number of feedback messages when the queue occupancy is within a predetermined error measure.

Li discloses sending an acknowledgement packet (feedback) to the sender when the average of the queue size (queue occupancy) exceeds a designated threshold (error measure). When the average of the queue size does not exceed the threshold there is no need for the acknowledgement packet, therefore reducing the feedback sent to the sender (disclosed in Col 4 line 51- Col 5 line 25). The motivation is the same as that for claim 2.

4. Claims 3 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Waclawsky et al. (US 5226041) in view of Lauer (US 5528591) in further vie wof Srinivasan (US 5991812)

Claim 3 Waclawsky does not disclose the predicting using a multi- timescale linear prediction method.

Srinivasan discloses an invention implemented in various ways, including a method and system that discloses the transmission of data packets applying queuing. The method/ system provides a plurality of queues and applies a queue selection method to select a queue and packet to be output. The method/ system discloses a queue time that is a continuous piece-wise linear function whose slope changes as the bandwidth (queue occupancy) changes (Col 7 lines 12-24).

Therefore it would have been obvious to one of the ordinary skill in the art at the time if the invention to enhance the efficient method of sending data packets from end to end using queuing and time samples as disclosed by Waclawsky, with the queue selection method disclosed by Srinivasan. The motivation for this enhancement is to decrease delay and avoid the dropping of packets (disclosed in Srinivasan Col 1 lines 54-65).

Claim 5 Waclawsky discloses computing a next window's worth of data packets (predicting queue occupancy), but does not disclose subtracting a mean for the time series from each pair of samples to produce a zero-mean time series for the predicting.

Srinivasan discloses a queue time that is a continuous piece-wise linear function whose slope changes as the bandwidth (queue occupancy) changes. Subtracting a

mean from the samples applies the concept of finding a standard deviation, which is well known in the art.

The motivation is same as for claim 3.

Response to Arguments

5. Applicant's arguments with respect to claims 1-16have been considered but are moot in view of the new ground(s) of rejection.

(a) The Applicant argued that the cited art does not disclose the Applicant's claimed "each sample ts equals a departure time of a packet n-maximum (departure time of a packet n-1, arrival time of a packet n).

The examiner maintains that the limitation is already discussed above in the rejection of claim 4, wherein Waclawsky discloses a cycle (ts) being the duration (difference) of time between the receipt of two separate responses. Furthermore, Waclawsky discloses the receipt of a cycle being equivalent to the beginning (departure) of another cycle (Col 6 lines 41-54).

(b) The Applcant argued that the cited art does not disclose the Applicant's claimed, "independently operating traffic management and content adaptation modules".

The examiner maintains that the limitation is already discussed in the rejection of claim 12, wherein the destination performs traffic management in that a congestion signal may be transmitted in the event of congestion, and furthermore, an adjustment in the window size is experienced in the sender node (Col 4 lines 23-33). It would have been obvious to one of the ordinary skill in the art at the time of the invention that both of these processes may be performed independently, where a congestion signal may be sent simply to indicate to a user the event of congestion, and a user may be given the

option of adjusting the window size regardless of whether or not a congestion signal is experienced.

Waclawsky discloses content adaptation using a window protocol which controls the amount of data (content) in transit between a source and destination (Col 1 lines 15-37).

Conclusion

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

(a) Mimura (US 2002/0027891) discloses a CPU in a source for monitoring the channel occupancy of a channel.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christopher P Grey whose telephone number is (571)272-3160. The examiner can normally be reached on 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chi Pham can be reached on (571)272-3179. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Christopher Grey
Examiner
Art Unit 2667

9/16/05

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SUPERVISORY PATENT EXAMINER
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9/19/05